and the search for correlation pattern is resumed at step **502**. If the unit has not received an enabled pattern recently, the override flag for the correlation pattern received is set at step **512**, allowing the unit to communicate outside of its assigned network area by proceeding to step **514**.

In order to communicate with another unit, this unit must use the correlation pattern that it received from the other unit. The received correlation pattern is posted at step **514** for the transmit process. The reception of the data packet is then continued at step **516**. In decision **518**, the system **30** determines if the data packet was received error free. If the data packet was not received error free, the result of decision **518** is NO. In that case, the receive process resets to step **502**. If the data packet was received error free, the result of decision **518** is YES, and the system **30** determines whether a response transmission is required in decision **520**. If no response is required, the result of decision **520** is NO, and the receive process resets to step **502**. It should be noted that the response may be immediate in response to an addressed acquire of this unit, time synchronized in response to a poll, or even randomly delayed as a CSMA response. If a response is required, the result of decision **520** is YES and the communications process continues at step **522** using the received correlation pattern. If the communications process is unsuccessful (no acknowledgment received), the result of decision **524** is NO and the system **30** resets the receive process to step **502**. If the communications is successful, decision **526** determines whether the process used an enabled or disabled (i.e., using the override) correlation pattern. If the correlation pattern was enabled, the result of decision **526** is YES and the unit is restricted to communications within its assigned network area so any override flags that are set are cleared at step **528**. If the correlation pattern was enabled override result of decision **526** is NO and any override flags are left set as the next reception is started by returning flow to step **502**.

In one example of the system **30**, a complicated system of fixed base stations **2** and remote units **6** was installed in British Columbia to allow aircraft of the Forest Protection Branch of the Ministry of Forests to be tracked, and to exchange digital messages. This was done as a part of a resource tracking system. The position of each aircraft was tracked using an on-board GPS receiver **50** (see FIG. 3B) which relays the position data to a RF modem that transmitted the position to the nearest base station **2**. Each aircraft was required to deliver its position to the central computer system **8** (see FIG. 2) every **30** seconds. The RF modems used transmit a ½ duplex frame at a power of between 100 watts and 150 watts to extend the range between base stations **2** to 200 miles. This minimized the number of base stations **2** required to cover the entire Province of British Columbia. The base stations **2** were installed on mountain tops to extend range of the cells C1 to C7 (see FIG. 1) and regions R1 and R2 as much as possible. The net effect of extending the range of the cells C1 to C7 was also to increase the number of remote units **6** that could transmit in contention with one another. In addition to the increased number of aircraft included in the larger cells C1 to C7, ground based vehicles and ground based work camps also have remote units **6** that transmit to the base station **2**.

The system **30** allowed the different types of remote units **6** to communicate effectively over the same channel at different polling intervals. For example, the aircraft position changes rapidly and thus requires a shorter polling interval to provide accurate position data. In contrast, a remote unit **6** at a ground based work camp changes location infrequently and thus can use a longer polling period to maintain the same level of accuracy in position data. The remote units **6** can communicate with any base station and can, if necessary, transmit information to another remote unit for relay to the base station if the remote unit is temporarily out of contact with the base station. The remote unit **6** can select any base station **2** with which to communicate and uses two operational modes to transmit data of differing priorities.

Thus, the system **30** allows flexibility in communications and greater utilization of the bandwidth than previous communications systems. The unique combination of operational modes allows for low priority data to be sent in a lower priority mode, and high priority data to be sent in the time slot allocated for that unit. The remote units can freely communicate with any base station and provisions are included to prevent reception from unauthorized remote units.

It is to be understood that even though various embodiments and advantages of the present invention have been set forth in the foregoing description, the above disclosure is illustrative only, and changes may be made in detail, yet remain within the broad principles of the invention. Therefore, the present invention is to be limited only by the appended claims.

What is claimed is:

1. A system for the control of radio communications, comprising:
   - a plurality of remote radio units having transmit and receive capability, each of said remote units operating in a first mode to transmit a poll request signal to initiate communications, and a second mode to transmit data;
   - a base station having transmit and receive capability, said base station receiving a plurality of respective poll requests from at least some of said plurality of remote radio units and transmitting a poll signal to said plurality of remote radio units, said poll signal including a poll response sequence instructing at least some remote radio units to when to respond to said poll signal;
   - a poll detection unit in each of said remote radio units to detect said poll signal; and
   - a control unit in each of said remote units to control transmission of said data in accordance with said poll response sequence, whereby said at least some remote radio units transmits in said second mode in accordance with said poll response sequence.

2. The system of claim **1** wherein transmissions from said base station and said plurality of remote units use a predetermined carrier frequency and said first mode is a carrier sense multiple access (CSMA) mode, the system further including a carrier sense circuit in each of said plurality of remote radio units to detect the presence of said carrier frequency, each of said remote radio units delaying a random length of time if said carrier sense circuit detects the presence of said carrier frequency and permitting transmission in said first mode only when said carrier sense circuit does not detect the presence of said carrier frequency.

3. The system of claim **1**, further including a sequence list within said base station, said sequence list containing data used to form said poll response sequence.

4. The system of claim **3** wherein said poll request signal from said plurality of remote radio units contains data indicative of communications interval for each of said remote radio units, said poll detection unit receiving said communications interval data and altering said sequence list, whereby said poll response sequence reflects said altered sequence list.